

I claim:

- 5 1. A device for treatment or fixation of a fractured, damaged or deteriorating bone or bones in a mid-foot region, said device having a proximal end, a distal end, and a central elongated body, said device comprising an attaching means to a bone or bones of a foot such that said attaching means secures said mid-foot region.
- 10 2. A device as in claim 1, wherein said bone or bones of said mid-foot comprises:
 - a) a first metatarsal bone,
 - b) a talus bone,
 - c) a medial cuneiform bone, and
 - 15 d) a navicular bone.
3. A device as in claim 2, wherein said device is an implant which is inserted into a medullary canal of said first metatarsal bone, said medial cuneiform bone, said navicular, and said talus bone.
- 20 4. A device as in claim 3, wherein said implant is an intramedullary nail.
5. A device as in claim 4, wherein said intramedullary nail is cannulated comprising a round cross-section with said central elongated body.
- 25 6. A device as in claim 4, wherein said intramedullary nail is adapted with said attaching means by way of a proximal fastener hole and a distal fastener hole to allow for compression of said mid-foot region.
- 30 7. A device as in claim 1, wherein said attaching means is accomplished by insertion of at least one fastener in at least one fastener hole or slot at either said proximal end, said distal end, or said central body of said implant.
8. A device as in claim 7, wherein said attaching means utilizes at least one proximal fastener hole and at least one distal fastener hole which allows for reduction and
35 compression of said mid-foot region.
9. A device as in claim 7, wherein said fastener is configured and dimensioned for insertion in at least one said fastener hole, further comprising a threaded hole for insertion of a screw, said screw having an optional threaded head portion and a
40 threaded shaft portion.
10. A method for treating or fixation of a fractured, damaged or deteriorating bone or bones in a mid-foot region comprising the steps of:
 - 45 (a) providing an implant sized to span a length from a patient's first metatarsal bone to a patient's talus bone, said implant having a proximal end, a distal end, and a central elongated body, wherein said central elongated body provides support for said mid-foot region;

- (b) reaming of a medullary canal of a first metatarsal bone, a medial cuneiform bone, a navicular bone, and a talus bone;
- 5 (c) inserting said implant into said medullary canal of said first metatarsal, medial cuneiform, navicular, and talus bones;
- (d) securing said implant by inserting at least one fastener through both a fastener hole or slot of said implant device, and into either said first metatarsal bone, said medial cuneiform bone, said navicular, or said talus bone.
- 10 11. The method of claim 10, wherein additional steps comprise:
- a) preceding the step of providing said implant, further comprising a taking of at least one x-ray picture for determining said sized span of said implant, wherein said taking of said x-ray picture is optional;
- 15 b) following the step of providing said implant, dislocating of a patient's phalanges bone or bones from said first metatarsal bone;
- 20 c) following the step of dislocating of said phalanges bone, performing an arthrotomy of said first metatarsal;
- d) following the step of performing said arthrotomy, removing a plug of bone from a patient's head of said first metatarsal bone, using a tubular chisel system, wherein removing said plug of bone is optional;
- 25 e) following of either the step of performing said arthrotomy or the step of removing said plug of bone, accomplishing closed reduction of said bone or bones of said mid-foot region, wherein said reduction may be limited to said medial cuneiform and said navicular bones;
- 30 f) following the step of accomplishing said closed reduction, inserting a guide-wire through said medullary canal of said first metatarsal, medial cuneiform, navicular, and talus bones, wherein said guide-wire may be a smooth guide-wire or a ball tip guide-wire, said ball tip guide wire may used for removing a reaming device;
- 35 g) following the step of inserting of either said guide-wires, the step of said reaming of said medullary canal, wherein said reaming performed over either of said guide-wires;
- 40 h) following the step of said reaming, inserting of said smooth guide-wire;
- i) following the step of inserting of said smooth guide-wire, attaching of said implant to a jig apparatus with an outrigger prior to the step of inserting of said implant into said medullary canal;
- 45 j) further comprising the step of securing said implant, securing of said proximal end is accomplished by inserting at least one said fastener through said fastener hole or slot of said implant into said first metatarsal bone;
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- k) following the step of securing said proximal end, compressing of said bone or bones in said mid-foot region, wherein said compressing is optional;
- 5 l) following either the step of compressing or the step of securing said proximal end, and further comprising the step of securing said implant, securing of said distal end is accomplished by inserting at least one said fastener through said fastener hole or slot of said implant into said first metatarsal, wherein said securing of said distal end is optional;
- 10 m) following the step of securing said distal end, replacing of said plug of bone is performed only if said step of removing of said plug of bone was performed;
- 15 n) following either the step of replacement of said plug or the step of securing said distal end, relocation of said phalanges to said first metatarsal is performed, followed by suturing of all incision sites.
12. The method of claim 11, wherein performing steps (e) – (h) may be accomplished under fluoroscopy.
- 20 13. The method of claim 10, wherein said step of insertion of said implant is performed under fluoroscopy, over said smooth guide-wire.
- 25 14. The method of claim 10 or 11, wherein the step of securing said implant by inserting at least one fastener may be placed percutaneously.
15. The method of claim 11, wherein the step of compression may be accomplished by using an in-line compression sleeve implant.
- 30 16. The method of claim 15, wherein the step of compression may be accomplished by determining the amount of compression applied with use of a depth gauge, said depth gauge may be a part of either said jig apparatus or said implant, wherein said depth gauge measures an amount of travel of said implant back up said medullary canal towards a point of insertion of said implant.
- 35 17. The method as in any one of claims 10-13, 15, or 16, wherein said implant is an intramedullary nail.
- 40 18. A system for treating deteriorating bones in a mid-foot region comprising:
- a) A device for treatment or fixation of a fractured, damaged or deteriorating bone or bones in a mid-foot region, said device having a proximal end, a distal end, and a central elongated body, said device comprising an attaching means to a bone or bones of a foot such that said attaching means secures said mid-foot region.
- 45 b) A method for treating or fixation of a fractured, damaged or deteriorating bone or bones in a mid-foot region comprising the steps of:
- 50 c) providing an implant sized to span a length from a patient's first metatarsal bone to a patient's talus bone, said implant having a proximal end, a distal

end, and a central elongated body, wherein said central elongated provides support for said mid-foot region;

- 5 d) reaming of a medullary canal of a first metatarsal bone, a medial cuneiform bone, a navicular bone, and a talus bone;
- e) inserting said implant into said medullary canal of said first metatarsal, medial cuneiform, navicular, and talus bones;
- 10 f) securing said implant by inserting at least one fastener through both a fastener hole or slot of said implant device, and into either said first metatarsal bone, said medial cuneiform bone, said navicular, or said talus bone.

15 19. A system as in claim 18 wherein additional steps comprise:

- 15 a) preceding the step of providing said implant, further comprising a taking of at least one x-ray picture for determining said sized span of said implant, wherein said taking of said x-ray picture is optional;
- 20 b) following the step of providing said implant, dislocating of a patient's phalanges bone or bones from said first metatarsal bone;
- c) following the step of dislocating of said phalanges bone, performing an arthrotomy of said first metatarsal is performed;
- 25 d) following the step of performing said arthrotomy, removing a plug of bone from a patient's head of said first metatarsal bone, using a tubular chisel system, wherein removing said plug of bone is optional;
- 30 e) following of either the step of performing said arthrotomy or the step of removing said plug of bone, accomplishing closed reduction of said bone or bones of said mid-foot region, wherein said reduction may be limited to said medial cuneiform and said navicular bones;
- 35 f) following the step of accomplishing said closed reduction, inserting a guide-wire through said medullary canal of said first metatarsal, medial cuneiform, navicular, and talus bones, wherein said guide-wire may be a smooth guide-wire or a ball tip guide-wire, said ball tip guide wire may used for removing a reaming device;
- 40 g) following the step of inserting of either said guide-wires, the step of said reaming of said medullary canal, wherein said reaming performed over either of said guide-wires;
- 45 h) following the step of said reaming, inserting of said smooth guide-wire;
- i) following the step of inserting of said smooth guide-wire, attaching of said implant to a jig apparatus with an outrigger prior to the step of inserting of said implant into said medullary canal;
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- j) further comprising the step of securing said implant, securing of said proximal end is accomplished by inserting at least one said fastener through said fastener hole or slot of said implant into said first metatarsal bone;
 - 5 k) following the step of securing said proximal end, compressing of said bone or bones in said mid-foot region, wherein said compressing is optional;
 - l) following either the step of compressing or the step of securing said proximal end, and further comprising the step of securing said implant, securing of said distal end is accomplished by inserting at least one said fastener through said fastener hole or slot of said implant into said first metatarsal, wherein said securing of said distal end is optional;
 - 10 m) following the step of securing said distal end, replacing of said plug of bone is performed only if said step of removing of said plug of bone was performed;
 - 15 n) following either the step of replacement of said plug or the step of securing said distal end, relocation of said phalanges to said first metatarsal is performed, followed by suturing of all incision sites.
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20. A system as in claim 19, comprising a medical procedure which may require an overnight hospital or medical facility stay, or comprising an out-patient procedure.